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The bombs are found strewn through the schists associated with the diabase. Their macroscopic features are carefully described with the aid of a number of figures. Some of the sheets are porphyritic with phenocrysts of irregularly outlined oligoclase surrounded by micas in a groundmass with the composition of normal diabase. The augite in this groundmass is sometimes idiomorphic, and in nearly all cases it is bordered by a rim of hornblende; often the hornblende replaces feldspar laths embedded in the pyroxene, forming of them complete pseudomorphs. The augite is replaced by calcite in some specimens, and by chlorite in others.

The four structural types recognized by the author are: compact gabbroitic phases, compact ophitic varieties, compact porphyritic kinds and amygdaloidal varieties. The gabbroitic diabases are all gabbro-like in the land specimen. In thin section the feldspar grains break up into an aggregate of feldspar laths. The ophitic diabases present no unusual features except that in the coarse grained varieties the large feldspar grains are filled with inclusions of the other components. The amygdaloids are sometimes porphyritic, more frequently normal. On the contact between the diabase and the schists, both rocks have suffered from the effects of contact action. The diabase is much denser near the contact than at a greater distance from it, and in places is much altered, quartz being an abundant product of this alteration The schists, which are mainly roofing slates, are crystallized near their contact with the eruptives.

MINERALOGY.[1]

The Production of Precious Stones in 1895.—Under this title Kunz[2] reviews the chief features of the gem industry for the year, giving specially copious details concerning the American production.

A six-carat diamond was found at Saukville, Wis., six miles from Milwaukee. In California several diamonds were found, one at Alpine Creek, Tulare Co., five near Oroville, Butte Co., and about as many more from near the "head of the creek," probably referring to one of the sources of the Feather River. From the association with peridotite, it seems probable that more may be found in this region.

In South Africa the De Beers Company produced diamonds to the value of about $15,000,000 in the year ending July 1, 1895, and the output of the same company for 1896 has been sold for $26,000,000. The total of the dividends paid by the South African diamond companies in the past ten years has been $58,000,000. A 640 carat diamond called the Rietz, found in 1895 is superior in quality to the Excelsior (971 carats) discovered a year or two earlier. The extent of the South African deposits is much greater than hitherto supposed, and many new workings are being opened. Near Winburg, in the Orange Free State, diamond diggings of a prehistoric race were discovered.

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[1] Edited by Prof. A. C. Gill, Cornell University, Ithaca, N. Y.

[2] Seventeenth Annual Report of the U. S. Geol. Survey, 1896, pp. 895–926.

Stonier states that the diamonds of New South Wales occur in a Tertiary (?) deposit, and may have been derived from an intrusive mass of peridotite, now serpentinized. They are said to be of better quality than those from South Africa.

The great advance in the price of carbonado, which has trebled in value, has stimulated the search for substitutes. The only source of carbonado is Bahia, Brazil, where a single lump weighing 3,073 carats was found during the year. The practicability of using artificial diamonds seems improbable in the light of Moissan's experiments, who has made several hundred crystals with a total weight of about ½ carat on an outlay of $2000. This is about 2000 times the value of natural diamond powder.

Mr. Kunz has named the hydrocarbon to which the phosphorescence of certain diamonds is attributed, *Tiffanyite.*[3]

Rubies have been found in place near Franklin, Macon Co., N. C., in decomposed gneiss with garnets and chlorite.

Brown and Judd[4] have recently described the occurrence and methods of obtaining the rubies of the noted Burmese mines, where the paragenesis is much like that of the corundum at Orange Co., N. Y., and Sussex Co., N. J. In Siam rubies and sapphires have been obtained during the past few years from the Patat Hills. From Black Creek, New Zealand, rubies are also reported. Sapphires and a few rubies are gotten by sluicing the detritus of a decomposed limestone in Fergus Co., Montana. The outlook in this locality is promising. The Montana rubies and sapphires are extremely varied in color.

A number of rich green tourmalines were found in 1895 at Mt. Mica, Paris, Me. Five of these were cut into gems of from five to fifty-seven carats in weight. At Haddam Neck, Conn., five hundred dollars worth of tourmalines of various colors were obtained.

Turquoise is reported from Cripple Creek and from Castle Rock Spring, Col. A mixture of prosopite and quartz closely resembling turquoise was found at Provo, Utah.

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[3] Trans. N. Y. Acad. Sci., May 20, 1895, p. 260.

[4] Phil. Trans., Vol. 187, A, pp. 151–228.

Unusually fine opals from near Salmon City, Idaho, as well as other occurrences of opal in Idaho, Washington, Oregon, Arizona, California, Colorado and Georgia are mentioned. Australian opals were sold for more than $100,000 in 1896.

In addition to the above named gems, mention is made at greater or less length of andalusite, cyanite, garnet, quartz, amethyst, chrysoprase, plasma, moss agate, labradorite, lapis lazuli, rhodochrosite, realgar, amber, xenotime and monazite.

The total value of the gem production in the United States for 1895 is placed at $113,621, of which $50,000 is accredited to turquoise.

The Coloring Matter of Minerals.—The cause of the varied colors of certain minerals is discussed by Weinschenk,[5] who presents a large number of facts tending to show that these colors are much less frequently due to organic substances than has been hitherto assumed. From considerations of the paragenesis of minerals, it is suggested that compounds of the elements tin, zirconium, titanium, cerium, didimium, lanthanum, nickel, tantalum and beryllium are in many cases more likely to be the true source of the minerals' colors. The effect of the cathode rays and X-rays in producing a similar color in minerals, even in some cases where the color had been previously destroyed by heating, is cited as evidence against the organic nature of the coloring matter (?). The occurrence of colored minerals as a result of the cooling of a fused magma is evidence in the same direction. The suggestion is thrown out that the color of certain minerals may be a valuable index to the conditions of their origin, when investigation shall have determined the true cause of the color.

Pearceite and Polybasite.—The systematic working out of the relationships existing between various isomorphous minerals has received another important contribution from Penfield.[6] Hitherto the name polybasite has been applied to a group of minerals whose chemical composition is of the type seen in the formula $Ag_9 SbS_6$, in which Ag is partly replaced by Cu, Fe or Zn, while the isomorphous arsenic molecules may occur in any proportion, almost to total replacement of antimony by arsenic in some specimens. The new name *Pearceite* is proposed in honor of Dr. Richard Pearce of Denver, Col., for the sulpharsenite, while the old name polybasite is restricted in its application to the sulphantimonite.

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[5] Zeitschr. d. D. geol. Ges., XLVIII, pp. 704–712, 1896.

[6] Am. Jour. Sci., CLII, pp. 17–29, July, 1896.

Pearceite is monoclinic; $\grave{a} : \bar{b} : c' = 1.7309 : 1 : 1.6199$; $\beta = 89° 51'$. The crystals have usually a hexagonal aspect. They are black in color with metallic lustre, hardness 3, and specific gravity about 6.15. It is suggested that the high percentage of copper—more than 18%—may account for the opacity of pearceite. It is very easily fusible and gives readily test reactions for its component elements. The pearceite specially studied occurs with quartz, calcite and chalcopyrite at the Drumlummon mine, Lewis and Clarke Co., Montana.

A careful study of the crystal form of polybasite leads to the conclusion that it also is monoclinic instead of orthorhombic or rhombohedral as previously supposed. The axial ratio $\grave{a} : \bar{b} : c' = 1.7309 : 1 : 1.5796$; $\beta = 90°$.

Perhaps the most interesting part of the paper is the comparison of pearceite and polybasite with each other and with certain other more or less allied minerals. From this it appears that arsenic compounds have a slightly longer vertical axis than the corresponding antimony minerals. Five cases are cited to illustrate this. Attention is also called to the fact that the prismatic angle is nearly 60° as a rule, and that in this respect chalcocite, Cu_2S, and stromeyerite, Cu AgS, closely resemble the sulpho-salts.

Miscellaneous Notes.—Davison[7] gives the name *Wardite* to a mineral which appears from a partial analysis to consist largely of a hydrous basic phosphate of aluminum. It occurs with the Utah variscite, and may be allied to turquoise and peganite.——More careful study of the percussion figure of the micas by Walker[8] discloses the fact that the angle between the rays varies in some instances very considerably from 60°. Muscovite showed an angle of 52° 53′ to 55° 57′, lepidolite 59° 7′ to 60° 12′, biotite about 60°, and phlogopite 60° 52′ to 63° 28′.——On five crystal fragments of the mineral leonite, $MgK_2(SO_4)_2 + 4H_2O$, Tenne[9] determined its crystal form to be monoclinic, with the axial ratio $\grave{a} : \bar{b} : c' = 1.03815 : 1 : 1.23349$, and $\beta = 84° 50'$. This is a considerable variation from the crystal form of blödite, which has the analogous composition $Mg\,Na_2\,(SO_4)_2 + 4H_2O$. The latter mineral is also monoclinic, but its axial ratio is $\grave{a} : \bar{b} : c' = 1.3494 : 1 : .6715$, and $\beta = 79° 16'$.

[7] Am. Jour. Sci., CLII, pp. 154, 155, 1896.

[8] Am. Jour. Sci., CLII, pp. 5–7, 1896.

[9] Zeitschr. d. D. geol. Ges., XLVIII, pp. 632–637, 1896.